licensed to provide service throughout the corresponding area. For example, a PCS licensee may relocate a system that affects two MTAs, but he only has the PCS license for one of the MTAs. The PCS provider who relocates the link will not be the first to provide service in the MTA in which he has no license. In that case, the PCS provider who is the first to provide service which will interfere with the links should be required to acquire the interference rights by reimbursing the relocater for 100% of the amount paid by the relocater of the link. Depreciation begins only when the service is actually initiated. At that point, the PCS provider offering service will become the full owner of the interference rights and will be entitled to future reimbursement from subsequent PCS provider(s) that benefit from the relocation of the microwave links.

When a PCS provider recognizes that he will be required to provide reimbursement as a result of the PCN process, he would contact a clearinghouse which would maintain the records of the cost paid for microwave relocation. This cost information would be broken down by link. He could then make the appropriate payment to the appropriate licensee(s) according to the formula or could negotiate a lower price, as described below.

Designated entities should be permitted to pay their share of the relocation costs in installment payments along the lines of the auction rules.

Finally, the formula in the plan sets a cap on compensation. It does not require that the amount calculated by the formula must be paid. Parties have the ability to negotiate lesser amounts. While we have addressed the issue of premium vs. direct costs through the use of a 10 year straight line depreciation, we also realize that parties may still be concerned that some links are associated with excessive premium costs. For this reason, we propose that the a cap of $600,000 be placed on the amount paid to relocate any link. C would be either the

amount paid to relocate the link or $600,000, whichever is less. This means the greatest amount that any PCS provider would have to pay as reimbursement would be $300,000 unless the PCS provider that relocated the link will not be providing service in the area of the link. In that case, the first PCS provider offering service would acquire the interference rights at 100% of the cost or $600,000, whichever is less.

This plan offers a simple mechanism to eliminate the free-rider problem and to encourage relocation of a link since the potential for reimbursement exists. However, reimbursement is only required if interference would have occurred had the microwave link continued to operate. PCS providers who engineer their systems in a way to avoid interference will not be required to pay anything. Consequently, the PCS provider relocating the link has every incentive to bargain aggressively in compensating the microwave incumbent, since he will surely have to bear part of the cost and may even bear the full cost if no other PCS provider benefits from the relocation.

The plan offers an easy method of compliance since interference rights are maintained in the FCC database and all PCS providers must perform an interference analysis to demonstrate non-interference pursuant to Section 24.237 of the Commission's Rules. A clearinghouse will administer the reimbursement process by maintaining all the cost and payment records related to each microwave link. There should be little reason for the Commission to be involved in disputes since the plan and formula that is its foundation are straightforward and clear-cut. To the extent that disputes arise, use of the Administrative Dispute Resolution pursuant to Section 1.18 of the Commission's Rules should be encouraged. (The proposed rule is set forth in Appendix D.)

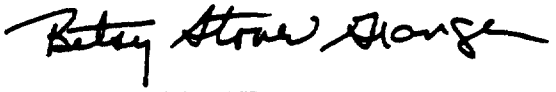
IV. CONCLUSION

Our plan demonstrates that the free rider problem can be resolved in a manner that will not place the Commission in the center of endless commercial disputes. We respectfully request that the Commission initiate a rulemaking proceeding on our plan as soon as possible. Time is truly of the essence in this case. Winners of the A and B block licenses are anxious to bring PCS to market as quickly as possible. Initiation of relocation of microwave links has already begun. If a cost sharing proposal is not adopted quickly, some links will not be relocated because the costs are too high for one licensee to absorb and other links will be relocated with

one licensee paying the full cost while other licensees derive a free benefit. Neither situation is in the public interest.

Respectfully submitted,

PACIFIC BELL MOBILE SERVICES



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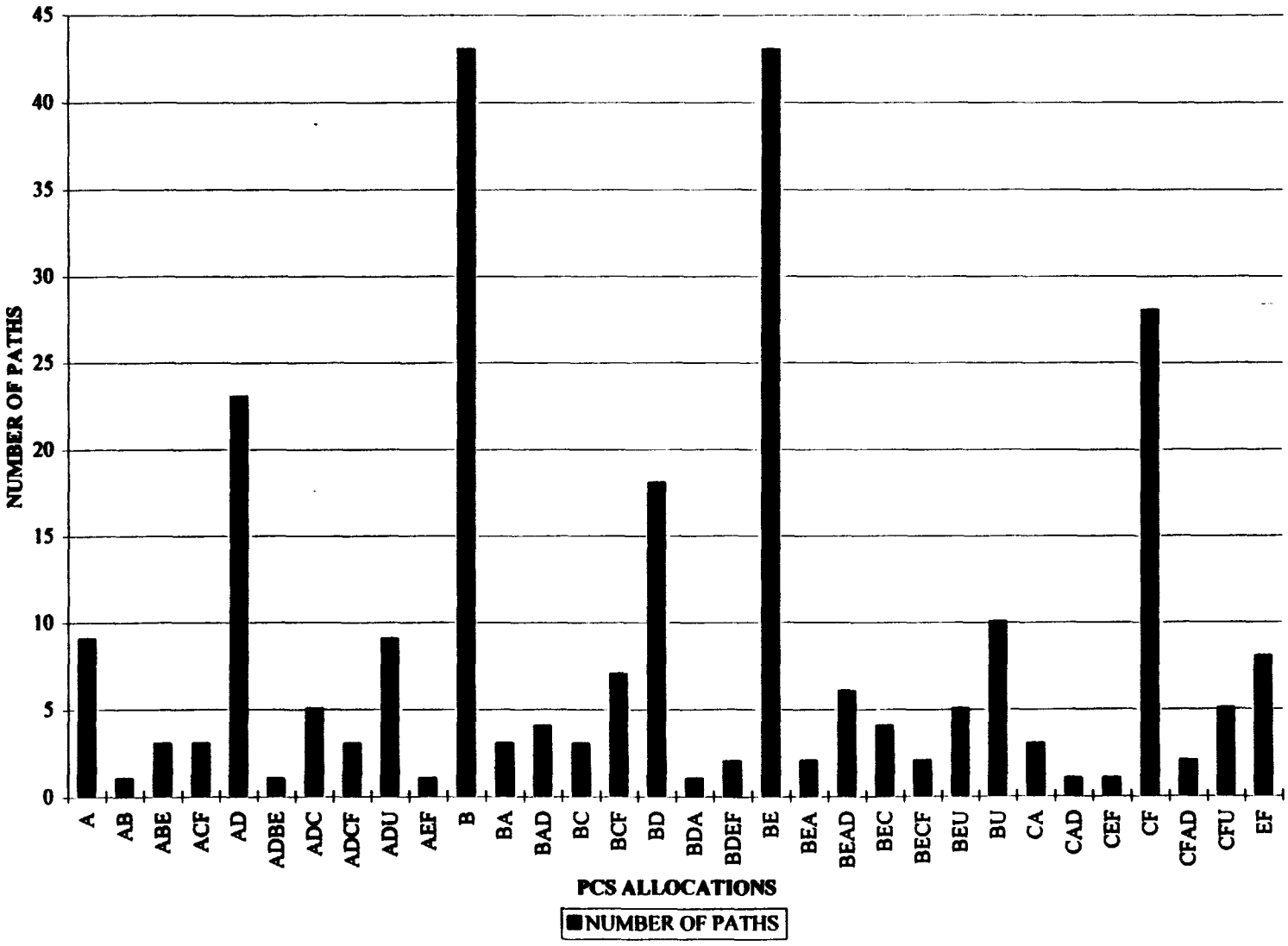
Date: May 5, 1995

PCS BLOCK DISTRIBUTION OF 260 MICROWAVE PATHS BEING RELOCATED IN THE SAN FRANCISCO AND LOS ANGELES MTAs FOR THE B BLOCK LICENSE



Appendix A

Appendix B

Categories of Costs for Microwave Relocation Records

New equipment (radio)

Frequency coordination

Engineering

Preparation of application and filing fees

Permit process

Antenna Subsystems

Training, Test, Equipment, and Spares

Tower Upgrade

DC Power and HVAC

Equipment Disposal

Network Equipment

Cost Sharing Calculation Examples

Initial amount to move MW link:	$300,000.00									
			Month	Total Payment	PCS OP1	PCS OP2	PCS OP3	PCS OP4	PCS OP5	PCS OP6
Date of interference rights:	1/1/96		1	$300,000.00	$300,000.00					
Date that 2nd operator activated:	7/4/96		7	$142,500.00	($142,500.00)	$142,500.00				
Date that 3rd operator activated:	11/15/97		23	$81,666.67	($40,833.33)	($40,833.33)	$81,666.67			
Date that 4th operator activated:				$0.00	$0.00	$0.00	$0.00	$0.00		
Date that 5th operator activated:				$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	
Date that 6th operator activated:				$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00
				NET COST:	$116,666.67	$101,666.67	$81,666.67	$0.00	$0.00	$0.00
				% of Total Cost:	39%	34%	27%	0%	0%	0%

Initial amount to move MW link:	$300,000.00									
			Month	Total Payment	PCS OP1	PCS OP2	PCS OP3	PCS OP4	PCS OP5	PCS OP6
Date interference rights obtained:	1/1/96		1	$300,000.00	$300,000.00					
Date that 2nd operator activated:	2/1/96		2	$148,750.00	($148,750.00)	$148,750.00				
Date that 3rd operator activated:	11/1/96		11	$91,666.67	($45,833.33)	($45,833.33)	$91,666.67			
Date that 4th operator activated:				$0.00	$0.00	$0.00	$0.00	$0.00		
Date that 5th operator activated:				$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	
Date that 6th operator activated:				$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00
				NET COST:	$105,416.67	$102,916.67	$91,666.67	$0.00	$0.00	$0.00
				% of Total Cost:	35%	34%	31%	0%	0%	0%

Initial amount to move MW link:	$300,000.00									
			Month	Total Payment	PCS OP1	PCS OP2	PCS OP3	PCS OP4	PCS OP5	PCS OP6
Date interference rights obtained:	1/1/98		25	$300,000.00	$300,000.00					
Date that 2nd operator activated:	1/1/98		25	$150,000.00	($150,000.00)	$150,000.00				
Date that 3rd operator activated:	1/1/02		73	$60,000.00	($30,000.00)	($30,000.00)	$60,000.00			
Date that 4th operator activated:	1/1/04		97	$30,000.00	($10,000.00)	($10,000.00)	($10,000.00)	$30,000.00		
Date that 5th operator activated:	1/1/04		97	$24,000.00	($6,000.00)	($6,000.00)	($6,000.00)	($6,000.00)	$24,000.00	
Date that 6th operator activated:	1/1/04		97	$20,000.00	($4,000.00)	($4,000.00)	($4,000.00)	($4,000.00)	($4,000.00)	$20,000.00
				NET COST:	$100,000.00	$100,000.00	$40,000.00	$20,000.00	$20,000.00	$20,000.00
				% of Total Cost:	33%	33%	13%	7%	7%	7%

Appendix C

Cost Sharing Calculation Examples - $600,000 Cost Cap

Initial amount to move MW link:	$1,000,000									
Cap on Cost	$600,000		Month	Total Payment	PCS OP1	PCS OP2	PCS OP3	PCS OP4	PCS OP5	PCS OP6
				$1,000,000	$1,000,000					
Date of interference rights:	1/1/96		1	$600,000						
Date that 2nd operator activated:	7/4/96		7	$285,000	($285,000)	$285,000				
Date that 3rd operator activated:	11/15/97		23	$163,333	($81,667)	($81,667)	$163,333			
Date that 4th operator activated:				$0	$0	$0	$0	$0		
Date that 5th operator activated:				$0	$0	$0	$0	$0	$0	
Date that 6th operator activated:				$0	$0	$0	$0	$0	$0	$0.00
				NET COST:	$633,333	$203,333	$163,333	$0	$0	$0
				% of Total Cost:	63%	20%	16%	0%	0%	0%

Initial amount to move MW link:	$900,000									
Cap on Cost	$600,000		Month	Total Payment	PCS OP1	PCS OP2	PCS OP3	PCS OP4	PCS OP5	PCS OP6
				$900,000	$900,000					
Date interference rights obtained:	1/1/96		1	$600,000						
Date that 2nd operator activated:	2/1/96		2	$297,500	($297,500)	$297,500				
Date that 3rd operator activated:	11/1/96		11	$183,333	($91,667)	($91,667)	$183,333			
Date that 4th operator activated:				$0	$0	$0	$0	$0		
Date that 5th operator activated:				$0	$0	$0	$0	$0	$0	
Date that 6th operator activated:				$0	$0	$0	$0	$0	$0	$0.00
				NET COST:	$510,833	$205,833	$183,333	$0	$0	$0
				% of Total Cost:	57%	23%	20%	0%	0%	0%

Initial amount to move MW link:	$800,000									
Cap on Cost	$600,000		Month	Total Payment	PCS OP1	PCS OP2	PCS OP3	PCS OP4	PCS OP5	PCS OP6
				$800,000	$800,000					
Date interference rights obtained:	1/1/98		25	$600,000						
Date that 2nd operator activated:	1/1/98		25	$300,000	($300,000)	$300,000				
Date that 3rd operator activated:	1/1/02		73	$120,000	($60,000)	($60,000)	$120,000			
Date that 4th operator activated:	1/1/04		97	$60,000	($20,000)	($20,000)	($20,000)	$60,000		
Date that 5th operator activated:	1/1/04		97	$48,000	($12,000)	($12,000)	($12,000)	($12,000)	$48,000	
Date that 6th operator activated:	1/1/04		97	$40,000	($8,000)	($8,000)	($8,000)	($8,000)	($8,000)	$40,000
				NET COST:	$400,000	$200,000	$80,000	$40,000	$40,000	$40,000
				% of Total Cost:	50%	25%	10%	5%	5%	5%

Appendix D

AMENDMENT TO PART 24

Microwave Relocation Cost Sharing Plan. A broadband licensee that relocates a microwave link is entitled to reimbursement from any other broadband PCS licensee(s) that benefits from the relocation of the link. Entitlement for reimbursement is determined in the following manner:

(a) Section 94.63 states the interference criteria for private fixed microwave licensees and establishes an obligation not to interfere and a right not to be interfered with. The broadband PCS licensee relocating the microwave link acquires the interference right for that link and is registered as such in the FCC database.

(b) Whenever another broadband PCS licensee determines as part of the prior coordination process required by Section 24.237 that he would have interfered with the link had it not been relocated, he must reimburse the holder of the interference rights and any other licensees that have provided reimbursement to the holder of the interference rights in equal shares. The amount can be mutually agreed upon by the parties or determined by the following formula.

$$R_N = \frac{C}{N} \times \frac{120 - (T_N - T_1)}{120}$$

C equals the actual amount paid to relocate the link or $600,000 whichever is less.

N equals the number of the interfering PCS provider. After the link is relocated, the next PCS provider who would interfere would be 2, the next one 3, and so on.

T_N equals the number of the month in which PCS provider N would have caused interference with the link i.e., when his system is placed in operation.

T_1 equals the month that the first PCS provider obtained the interference rights as evidenced by the interference rights being recorded in the FCC database.

(c) If the holder of the interference rights to a link will never initiate service that would have interfered with link, (e.g., an entire microwave system has been relocated but the holder of the interference rights does not have a license for the entire territory corresponding with

the microwave system), the PCS provider who first provides service that will interfere with the link must reimburse the provider that relocated the system for 100% of cost paid to relocate the link or $600,000 whichever is less. He then acquires the interference rights to that link and is entitled to all subsequent reimbursement as described in (b).

(d) Designated entities, as defined in Section 24.709 of the Rules, are entitled to make their reimbursement payments in installments. Interest is based on the rate for 10-year U.S. Treasury obligations applicable on the date on which interference would have occurred had the link not been relocated, plus 2.5 percent. Principal and interest payments are amortized over the time period of the license.

(e) A designated clearinghouse will maintain the microwave relocation cost records. Access to those records is limited to PCS licensees that determine as part of the prior coordination process that they would have interfered with a microwave link but for its relocation.

(f) Licensees are encouraged to use Administrative Dispute Resolution pursuant to Section 1.18 of the Commission's Rules to settle disputes.

PCS Microwave Relocation Cost Sharing: A Case Study

May 17, 1995

Pacific Bell Mobile Services

Objectives

- Provide an example of a microwave relocation and apply the Pacific Bell Mobile Services Cost Sharing proposal to illustrate the process and results of our cost sharing plan.
- Our cost sharing plan is based on economic efficiency and requires all parties who benefit from a microwave relocation to contribute to the cost. Costs are depreciated over a 10 year straight line depreciation schedule.
- Two microwave links in the Los Angeles area were selected for this case study.

Existing Conditions

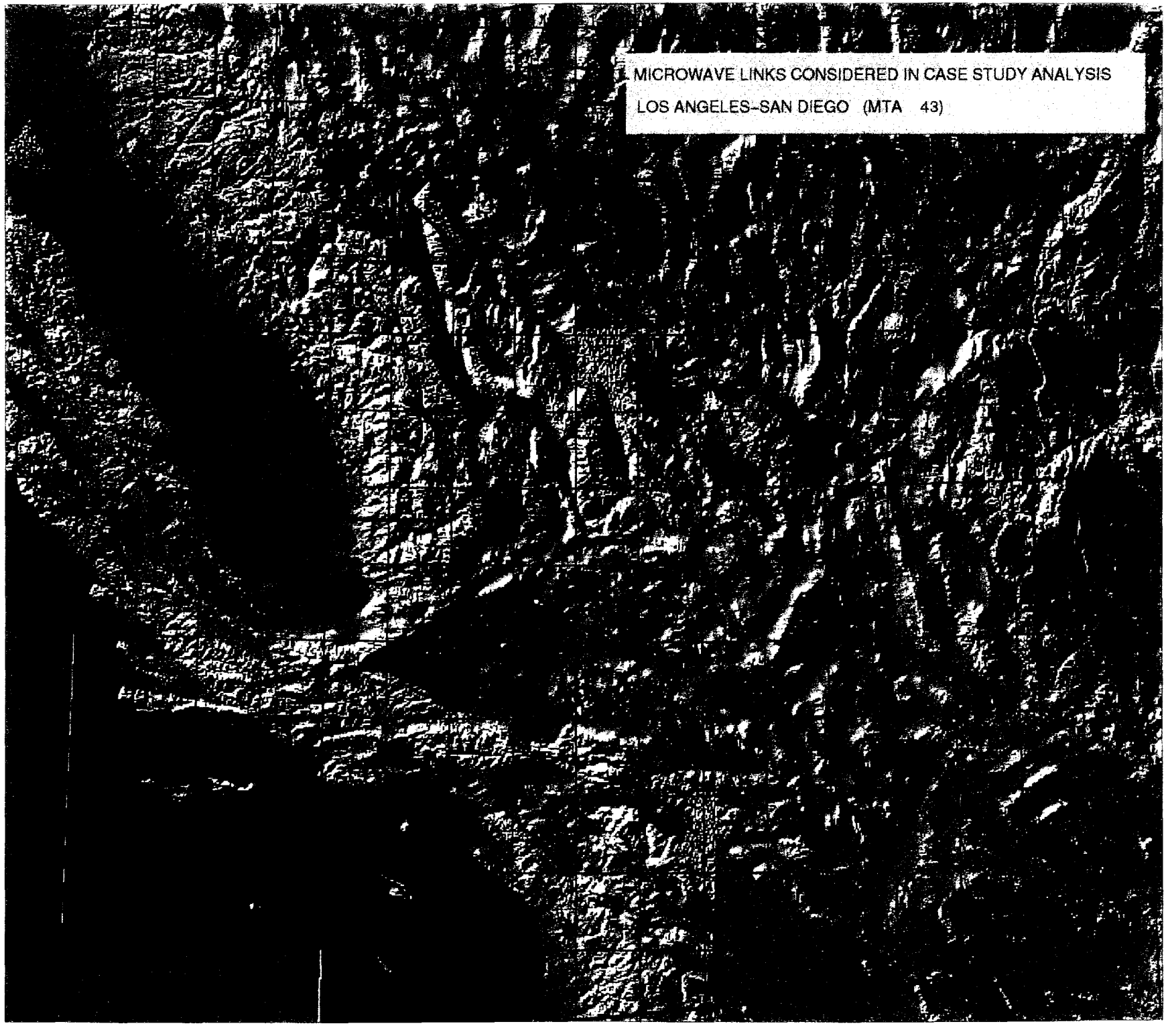
- The two links selected are currently under negotiation and are operated by the same incumbent.
- The microwave links operate at 1890/1980 and 1970/1890 MHz. The paths are 14.7 and 11.6 miles long and have a 96 channel, digital, capacity.
- Due to frequency congestion in the Los Angeles area, a 10 GHz radio replacement is being proposed.
- An initial interference analysis of the two links was performed to examine the effect of our PCS system on these links. This led to contact and negotiation with the operator

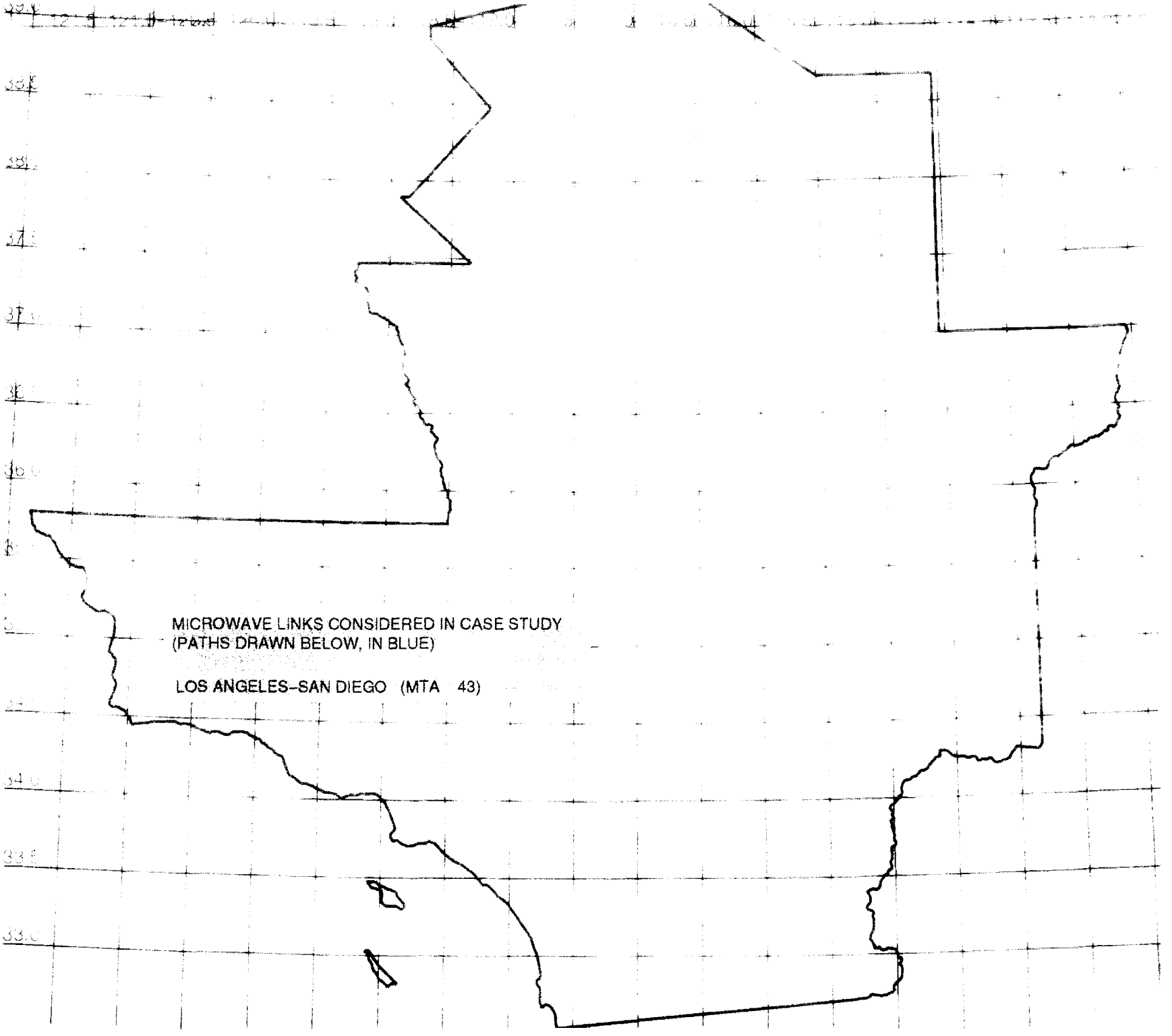
Cost Estimates

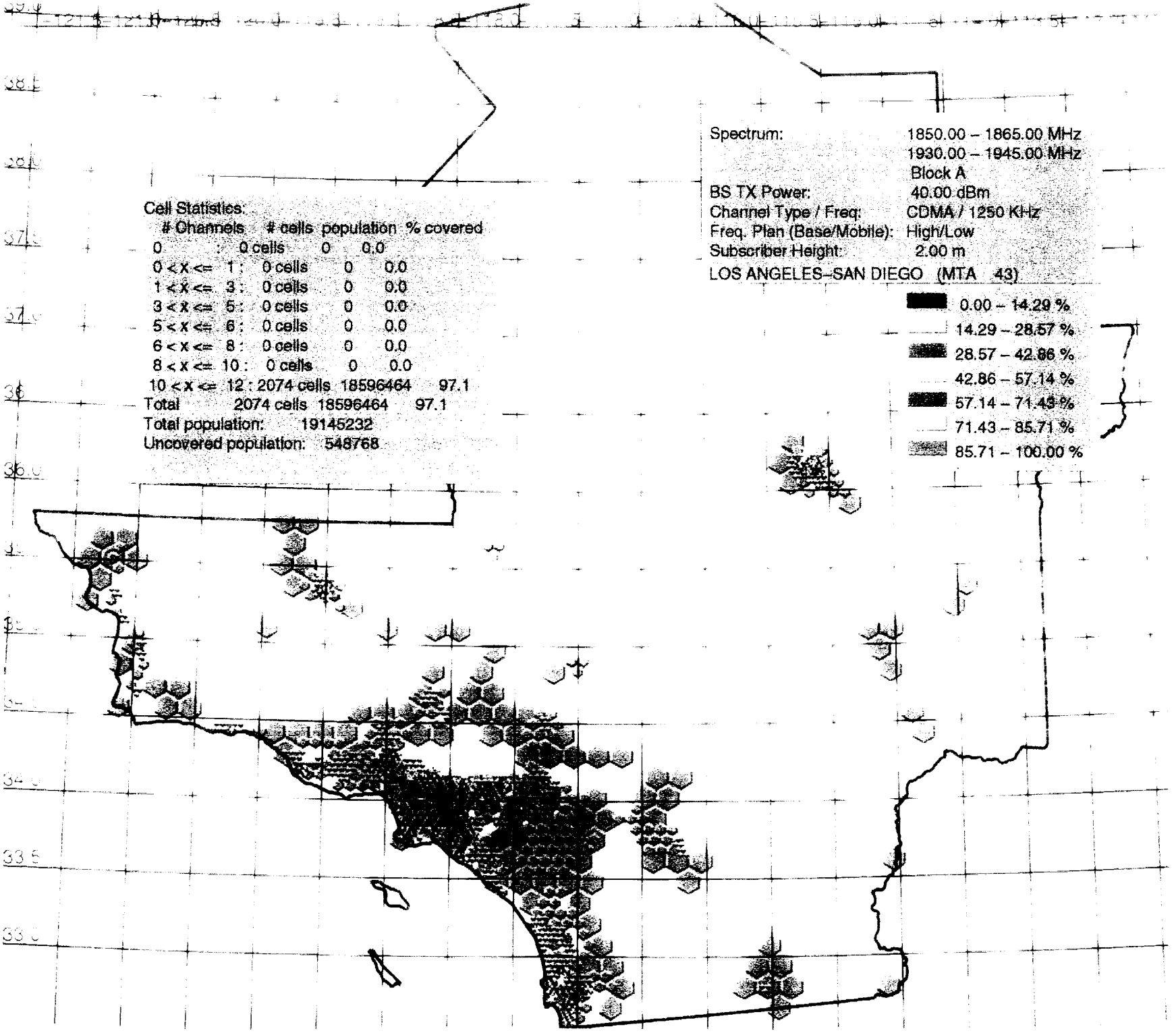
- The following are estimated costs for relocating each of the two microwave links:
  - Path Survey $ 2,650
  - Microwave Radio $ 82,000
  - Microwave Ant. $ 5,835
  - Installation $ 19,240
  - Freq. Coordination $ 1,275
  - FCC App & Fees $ 1,250
  - Training $ 6,250
  - Spares, Test Equip $ 8,000
  - » **Total Cost per path** **$ 126,500**
  - » **Total Cost of job** **$ 253,000**

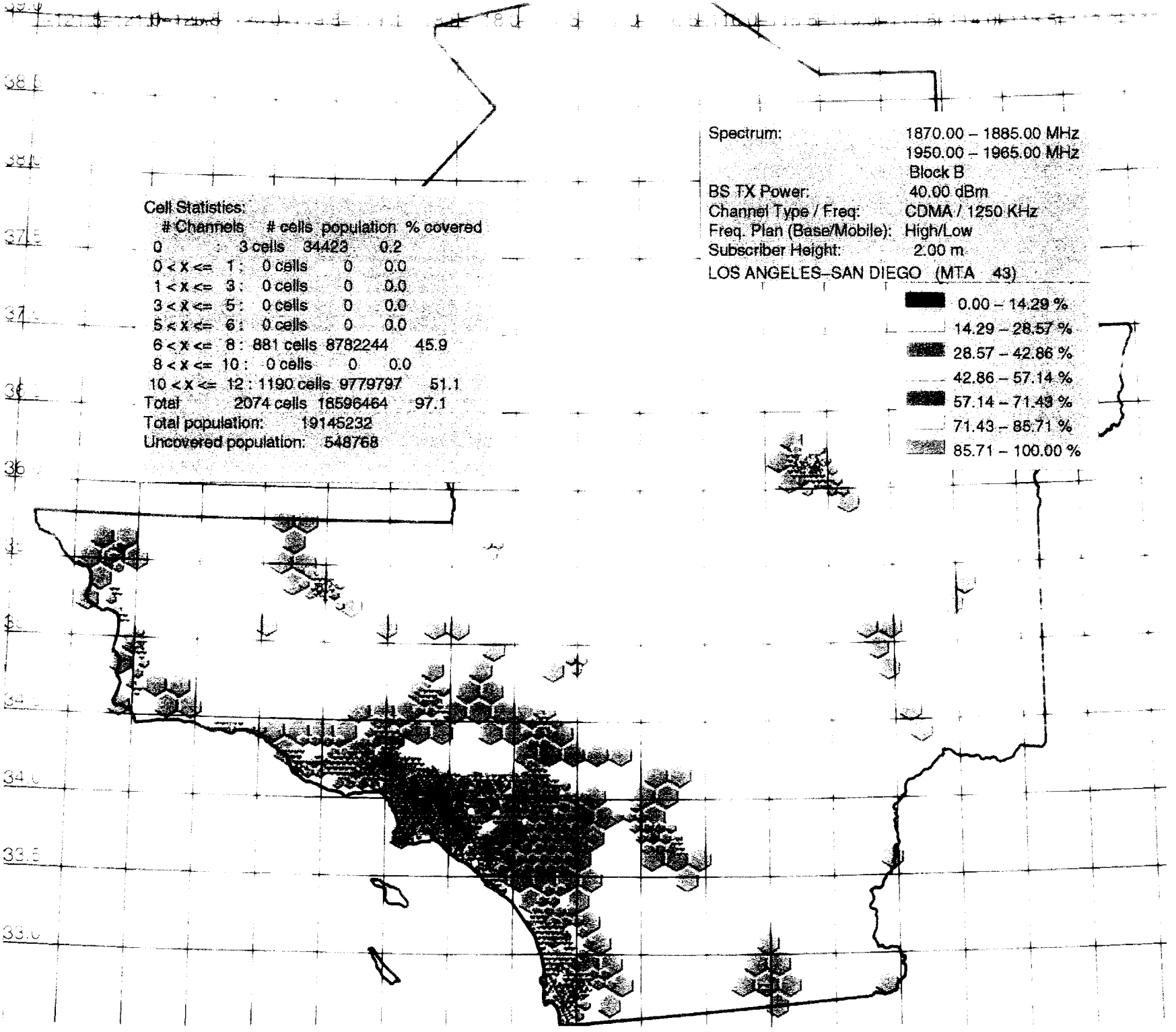
Interference Analysis Example

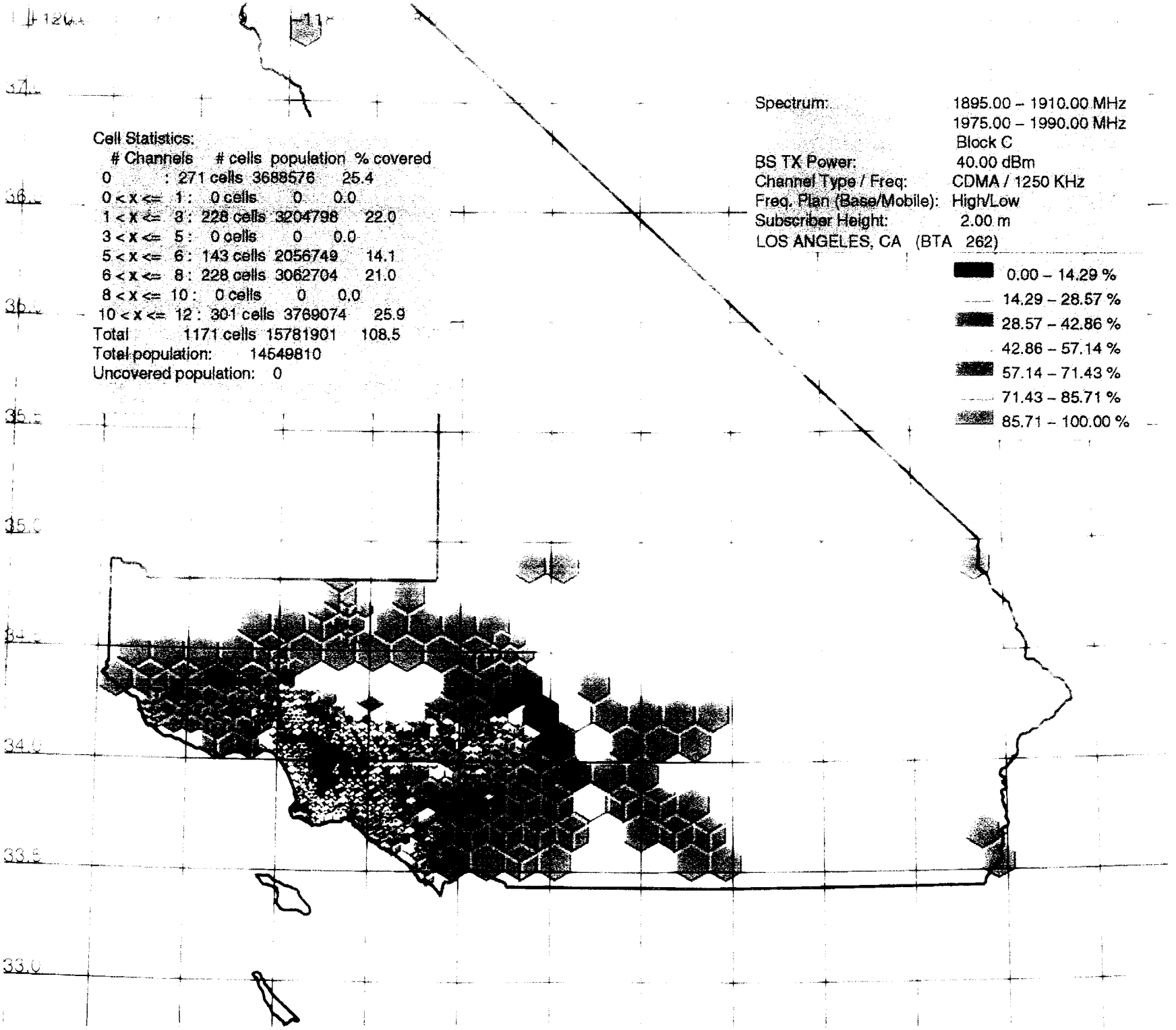
- The following plots show an interference analysis for all the PCS blocks.
- The first plot shows the Los Angeles MTA with terrain and the two microwave links.
- The next plot shows the Los Angeles MTA without terrain and the two microwave links.
- The next six plots show the results for CDMA based system for Blocks A,B,C,D,E, &F
- The next six plots show the results for TDMA based systems for Blocks A,B,C,D,E,&F.

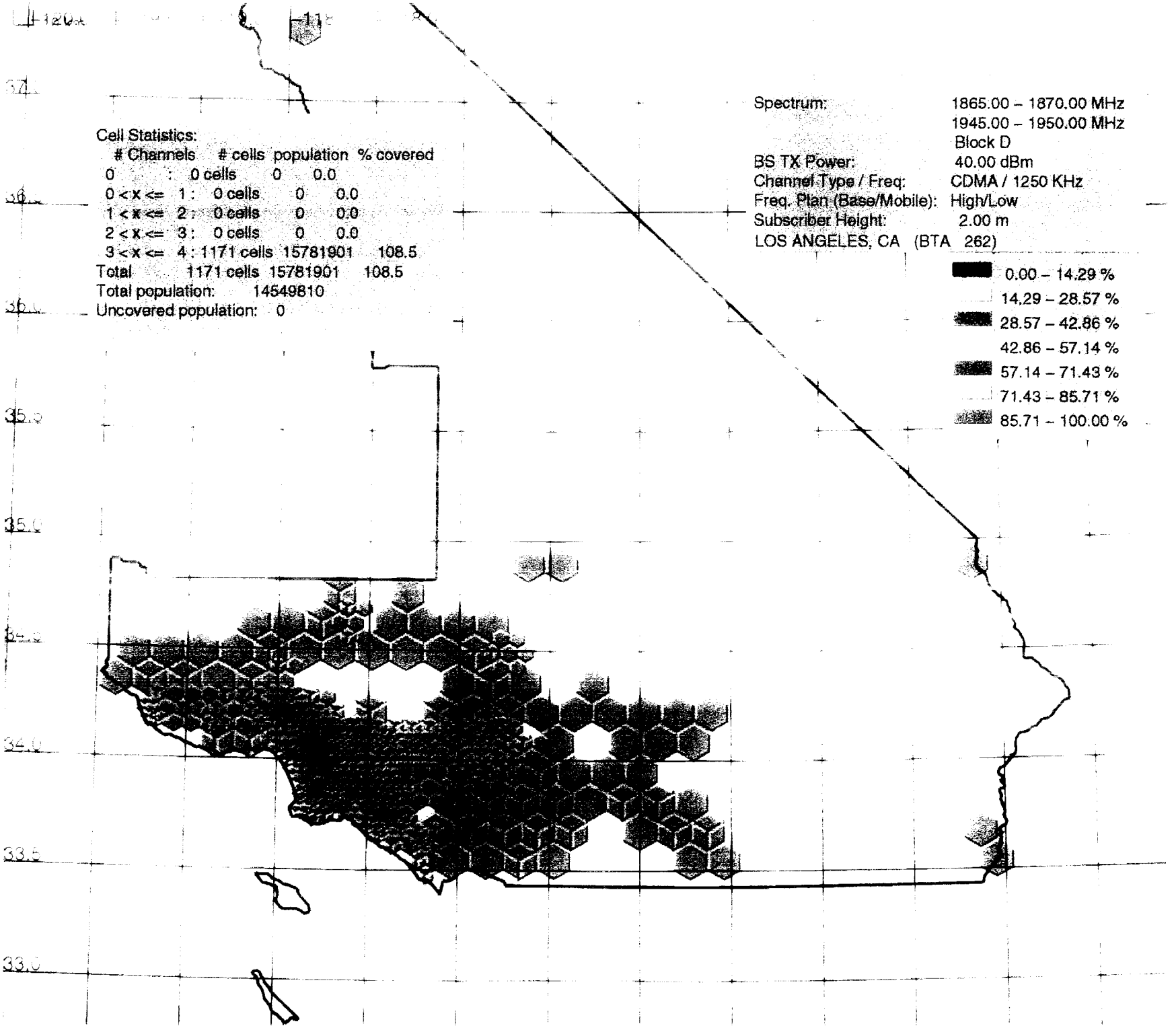

MICROWAVE LINKS CONSIDERED IN CASE STUDY ANALYSIS
LOS ANGELES–SAN DIEGO (MTA 43)

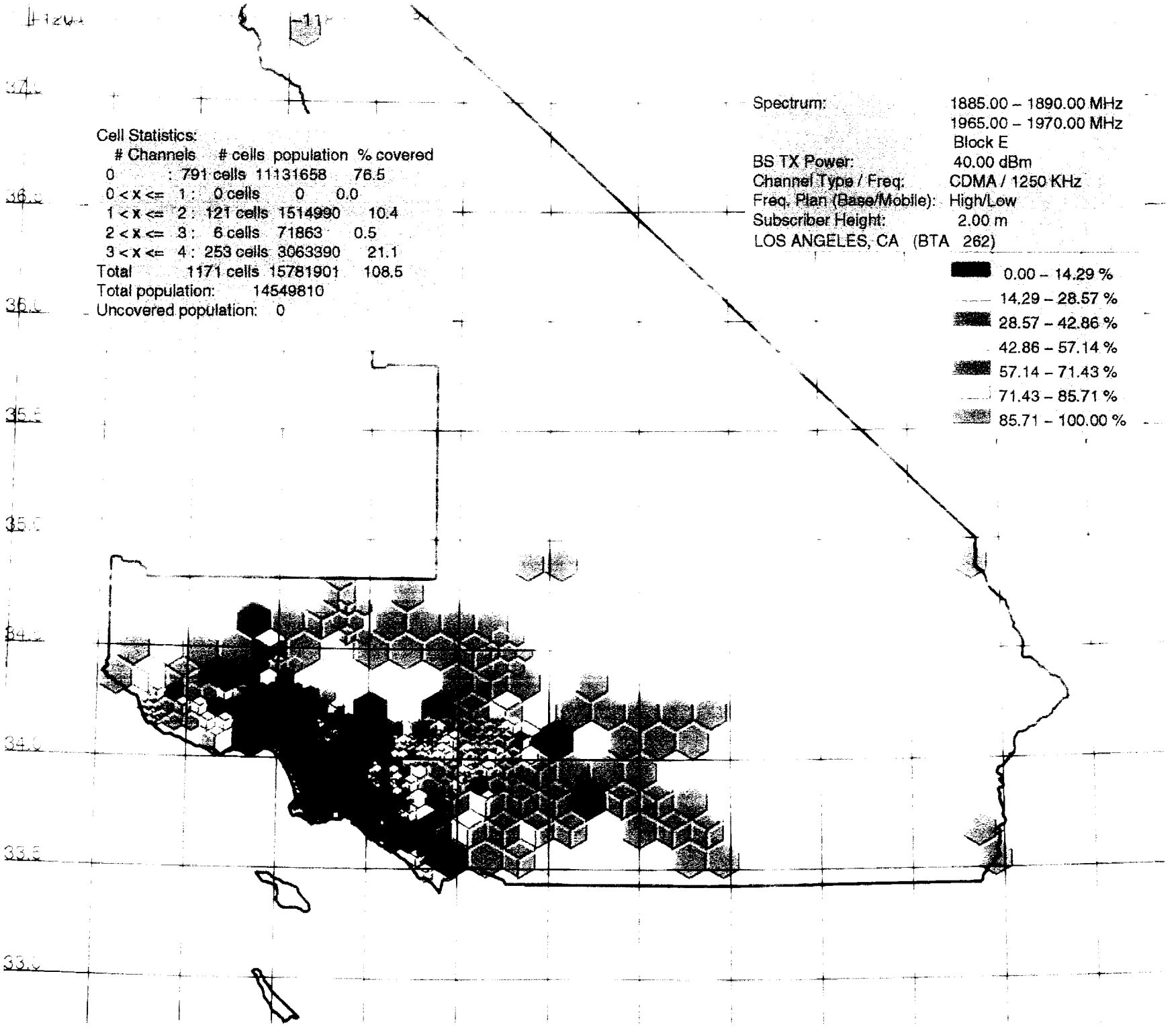

MICROWAVE LINKS CONSIDERED IN CASE STUDY
(PATHS DRAWN BELOW, IN BLUE)
LOS ANGELES–SAN DIEGO (MTA 43)

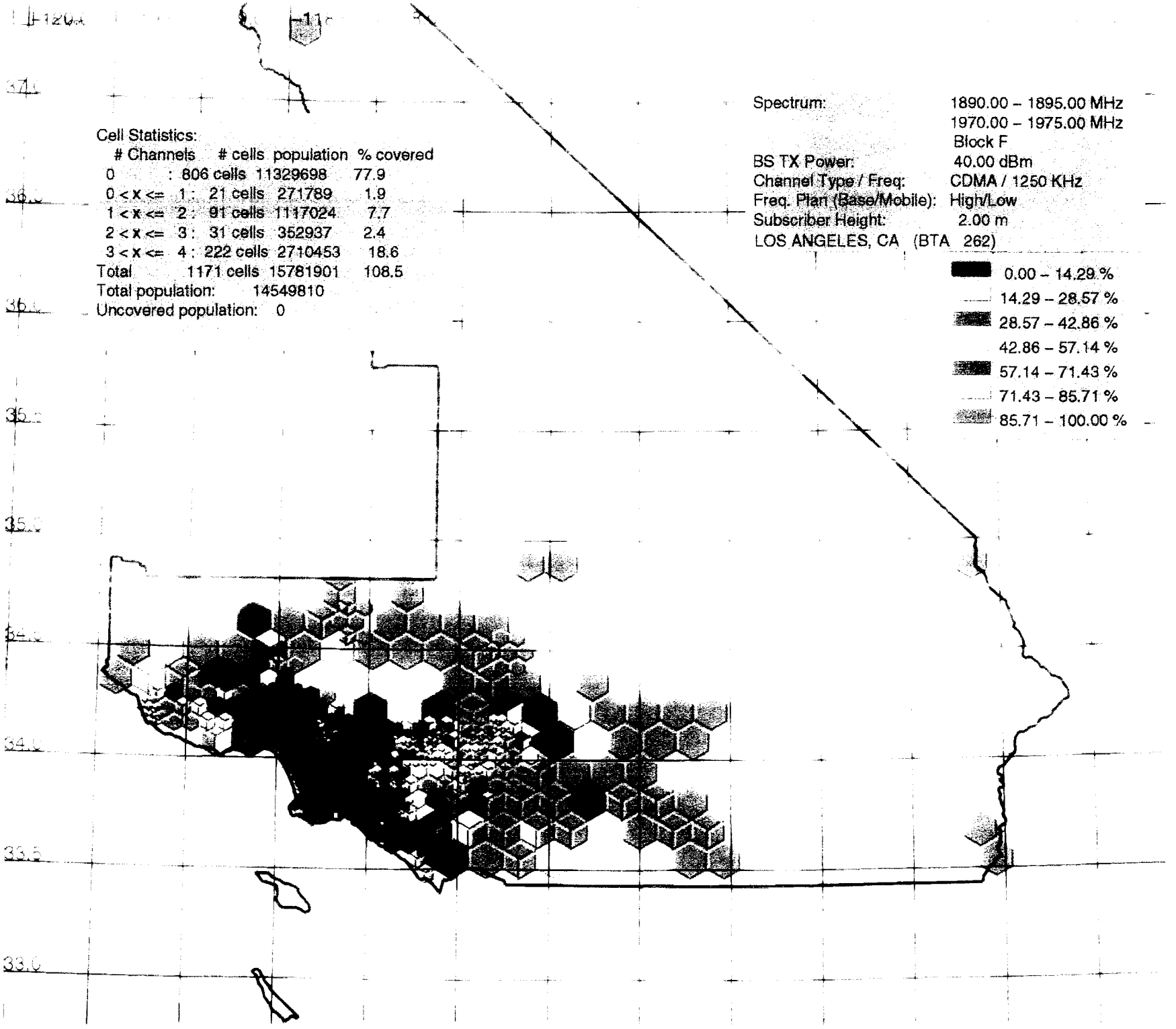

Cell Statistics:
Channels # cells population % covered
0 : 0 cells 0 0.0
0 < x <= 1 : 0 cells 0 0.0
1 < x <= 3 : 0 cells 0 0.0
3 < x <= 5 : 0 cells 0 0.0
5 < x <= 6 : 0 cells 0 0.0
6 < x <= 8 : 0 cells 0 0.0
8 < x <= 10 : 0 cells 0 0.0
10 < x <= 12 : 2074 cells 18596464 97.1
Total 2074 cells 18596464 97.1
Total population: 19145232
Uncovered population: 548768
Spectrum: 1850.00 – 1865.00 MHz
1930.00 – 1945.00 MHz
Block A
BS TX Power: 40.00 dBm
Channel Type / Freq: CDMA / 1250 KHz
Freq. Plan (Base/Mobile): High/Low
Subscriber Height: 2.00 m
LOS ANGELES–SAN DIEGO (MTA 43)
0.00 – 14.29 %
14.29 – 28.57 %
28.57 – 42.86 %
42.86 – 57.14 %
57.14 – 71.43 %
71.43 – 85.71 %
85.71 – 100.00 %

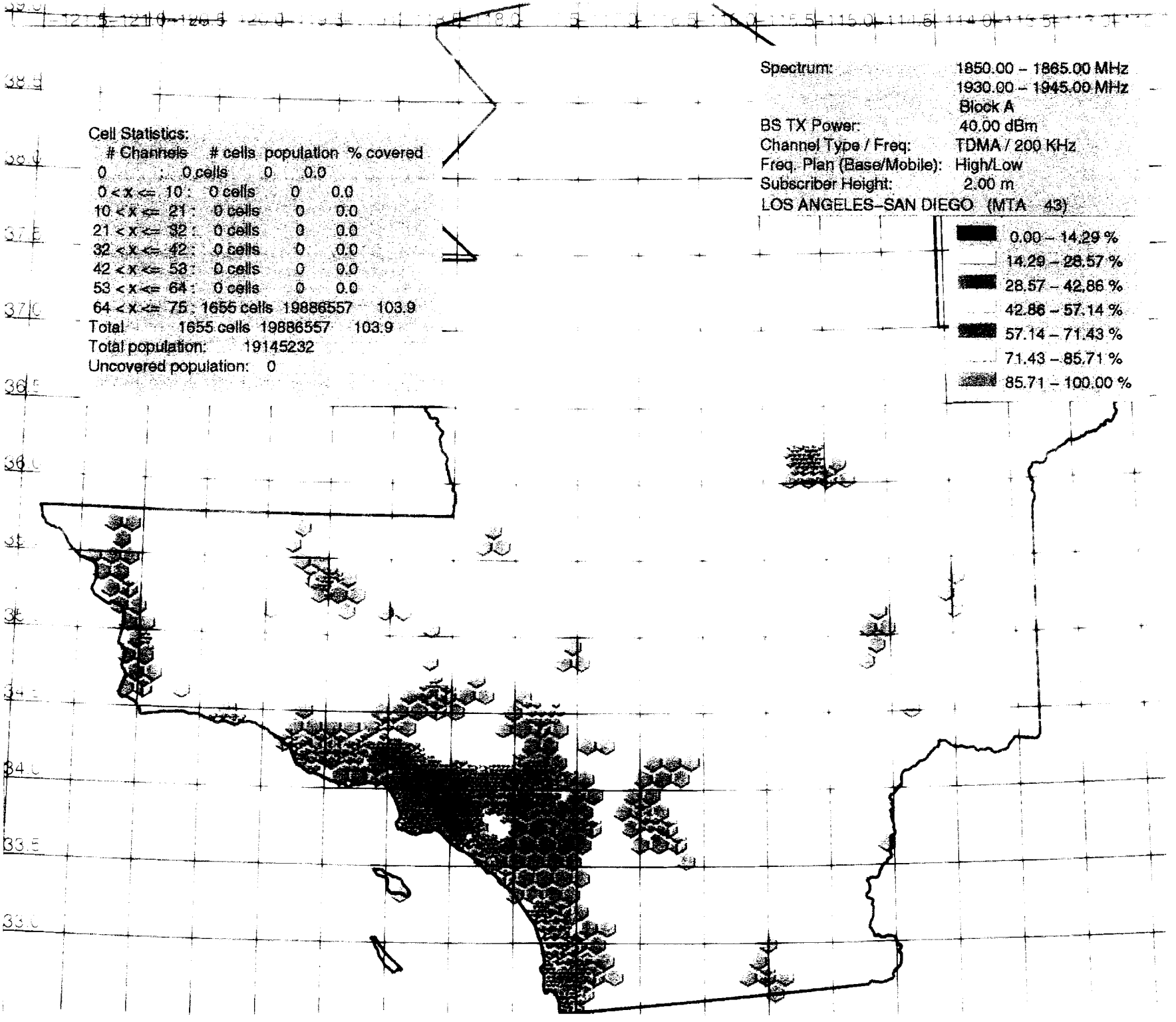

Cell Statistics:
Channels # cells population % covered
0 : 3 cells 34423 0.2
0 < x <= 1 : 0 cells 0 0.0
1 < x <= 3 : 0 cells 0 0.0
3 < x <= 5 : 0 cells 0 0.0
5 < x <= 6 : 0 cells 0 0.0
6 < x <= 8 : 881 cells 8782244 45.9
8 < x <= 10 : 0 cells 0 0.0
10 < x <= 12 : 1190 cells 9779797 51.1
Total 2074 cells 18596464 97.1
Total population: 19145232
Uncovered population: 548768
Spectrum: 1870.00 – 1885.00 MHz
1950.00 – 1965.00 MHz
Block B
BS TX Power: 40.00 dBm
Channel Type / Freq: CDMA / 1250 KHz
Freq. Plan (Base/Mobile): High/Low
Subscriber Height: 2.00 m
LOS ANGELES–SAN DIEGO (MTA 43)
0.00 – 14.29 %
14.29 – 28.57 %
28.57 – 42.86 %
42.86 – 57.14 %
57.14 – 71.43 %
71.43 – 85.71 %
85.71 – 100.00 %

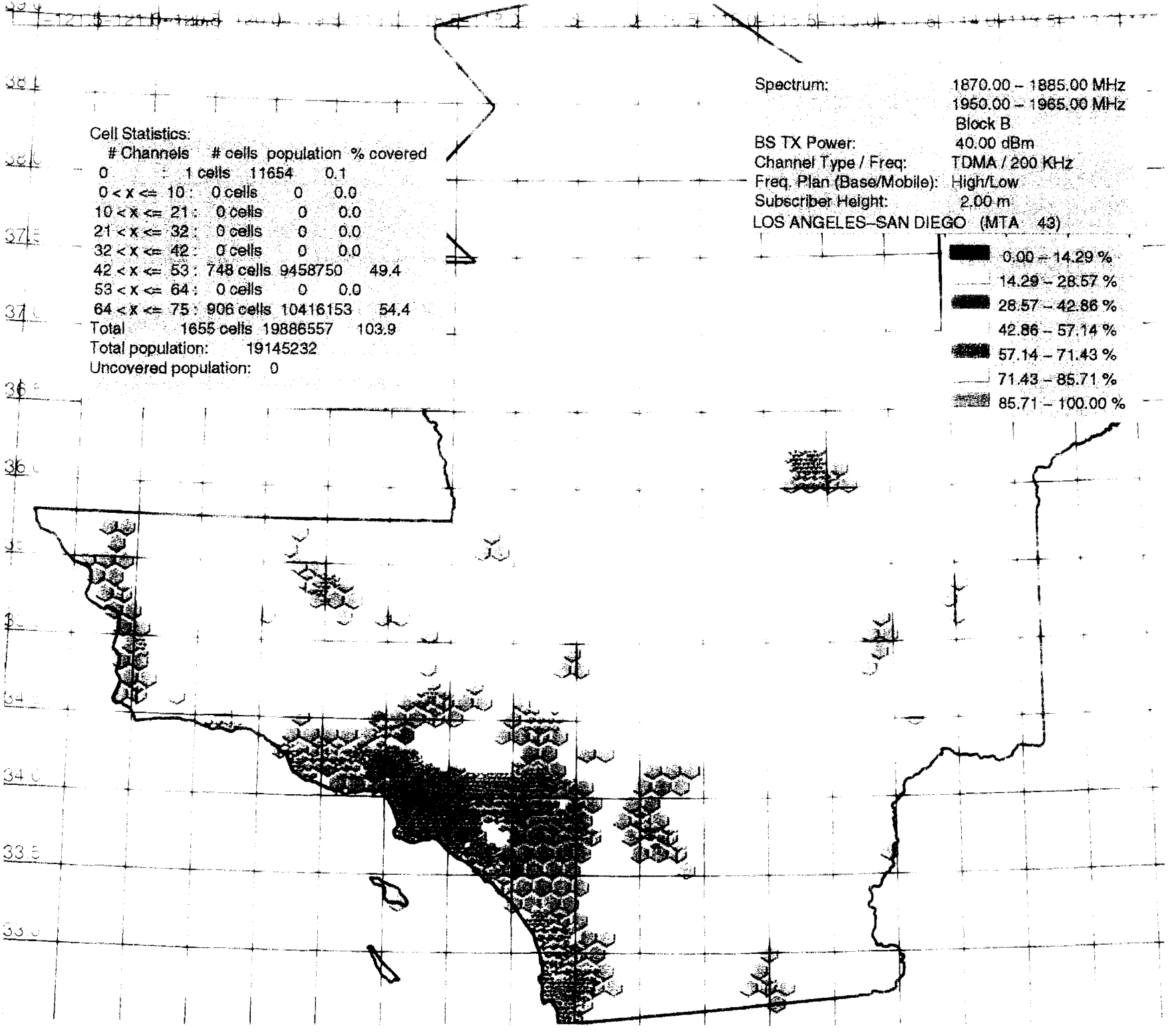

Cell Statistics:
Channels # cells population % covered
0 : 271 cells 3688576 25.4
0 < x <= 1 : 0 cells 0 0.0
1 < x <= 3 : 228 cells 3204798 22.0
3 < x <= 5 : 0 cells 0 0.0
5 < x <= 6 : 143 cells 2056749 14.1
6 < x <= 8 : 228 cells 3062704 21.0
8 < x <= 10 : 0 cells 0 0.0
10 < x <= 12 : 301 cells 3769074 25.9
Total 1171 cells 15781901 108.5
Total population: 14549810
Uncovered population: 0
Spectrum: 1895.00 – 1910.00 MHz
1975.00 – 1990.00 MHz
Block C
BS TX Power: 40.00 dBm
Channel Type / Freq: CDMA / 1250 KHz
Freq. Plan (Base/Mobile): High/Low
Subscriber Height: 2.00 m
LOS ANGELES, CA (BTA 262)
0.00 – 14.29 %
14.29 – 28.57 %
28.57 – 42.86 %
42.86 – 57.14 %
57.14 – 71.43 %
71.43 – 85.71 %
85.71 – 100.00 %
34.0
33.5
33.0


Cell Statistics:
Channels # cells population % covered
0 : 0 cells 0 0.0
0 < x <= 1 : 0 cells 0 0.0
1 < x <= 2 : 0 cells 0 0.0
2 < x <= 3 : 0 cells 0 0.0
3 < x <= 4 : 1171 cells 15781901 108.5
Total 1171 cells 15781901 108.5
Total population: 14549810
Uncovered population: 0
Spectrum: 1865.00 – 1870.00 MHz
1945.00 – 1950.00 MHz
Block D
BS TX Power: 40.00 dBm
Channel Type / Freq: CDMA / 1250 KHz
Freq. Plan (Base/Mobile): High/Low
Subscriber Height: 2.00 m
LOS ANGELES, CA (BTA 262)
0.00 – 14.29 %
14.29 – 28.57 %
28.57 – 42.86 %
42.86 – 57.14 %
57.14 – 71.43 %
71.43 – 85.71 %
85.71 – 100.00 %
35.0
34.0
33.5
33.0


Cell Statistics:
Channels # cells population % covered
0 : 791 cells 11131658 76.5
0 < x <= 1 : 0 cells 0 0.0
1 < x <= 2 : 121 cells 1514990 10.4
2 < x <= 3 : 6 cells 71863 0.5
3 < x <= 4 : 253 cells 3063390 21.1
Total 1171 cells 15781901 108.5
Total population: 14549810
Uncovered population: 0
Spectrum: 1885.00 – 1890.00 MHz
1965.00 – 1970.00 MHz
Block E
BS TX Power: 40.00 dBm
Channel Type / Freq: CDMA / 1250 KHz
Freq. Plan (Base/Mobile): High/Low
Subscriber Height: 2.00 m
LOS ANGELES, CA (BTA 262)
0.00 – 14.29 %
14.29 – 28.57 %
28.57 – 42.86 %
42.86 – 57.14 %
57.14 – 71.43 %
71.43 – 85.71 %
85.71 – 100.00 %


Cell Statistics:
Channels # cells population % covered
0 : 806 cells 11329698 77.9
0 < x <= 1 : 21 cells 271789 1.9
1 < x <= 2 : 91 cells 1117024 7.7
2 < x <= 3 : 31 cells 352937 2.4
3 < x <= 4 : 222 cells 2710453 18.6
Total 1171 cells 15781901 108.5
Total population: 14549810
Uncovered population: 0
Spectrum: 1890.00 – 1895.00 MHz
1970.00 – 1975.00 MHz
Block F
BS TX Power: 40.00 dBm
Channel Type / Freq: CDMA / 1250 KHz
Freq. Plan (Base/Mobile): High/Low
Subscriber Height: 2.00 m
LOS ANGELES, CA (BTA 262)
0.00 – 14.29 %
14.29 – 28.57 %
28.57 – 42.86 %
42.86 – 57.14 %
57.14 – 71.43 %
71.43 – 85.71 %
85.71 – 100.00 %


Spectrum: 1850.00 – 1865.00 MHz
1930.00 – 1945.00 MHz
Block A
BS TX Power: 40.00 dBm
Channel Type / Freq: TDMA / 200 KHz
Freq. Plan (Base/Mobile): High/Low
Subscriber Height: 2.00 m
LOS ANGELES–SAN DIEGO (MTA 43)
0.00 – 14.29 %
14.29 – 28.57 %
28.57 – 42.86 %
42.86 – 57.14 %
57.14 – 71.43 %
71.43 – 85.71 %
85.71 – 100.00 %
Cell Statistics:
Channels # cells population % covered
0 : 0 cells 0 0.0
0 < x <= 10 : 0 cells 0 0.0
10 < x <= 21 : 0 cells 0 0.0
21 < x <= 32 : 0 cells 0 0.0
32 < x <= 42 : 0 cells 0 0.0
42 < x <= 53 : 0 cells 0 0.0
53 < x <= 64 : 0 cells 0 0.0
64 < x <= 75 : 1655 cells 19886557 103.9
Total 1655 cells 19886557 103.9
Total population: 19145232
Uncovered population: 0


Cell Statistics:
Channels # cells population % covered
0 : 1 cells 11654 0.1
0 < x <= 10 : 0 cells 0 0.0
10 < x <= 21 : 0 cells 0 0.0
21 < x <= 32 : 0 cells 0 0.0
32 < x <= 42 : 0 cells 0 0.0
42 < x <= 53 : 748 cells 9458750 49.4
53 < x <= 64 : 0 cells 0 0.0
64 < x <= 75 : 906 cells 10416153 54.4
Total 1655 cells 19886557 103.9
Total population: 19145232
Uncovered population: 0
Spectrum: 1870.00 – 1885.00 MHz
1950.00 – 1965.00 MHz
Block B
BS TX Power: 40.00 dBm
Channel Type / Freq: TDMA / 200 KHz
Freq. Plan (Base/Mobile): High/Low
Subscriber Height: 2.00 m
LOS ANGELES–SAN DIEGO (MTA 43)
0.00 – 14.29 %
14.29 – 28.57 %
28.57 – 42.86 %
42.86 – 57.14 %
57.14 – 71.43 %
71.43 – 85.71 %
85.71 – 100.00 %